PAWTUXET RIVER BASIN

RIVER SECTION	PRESENT WATER QUALITY CONDITIONS	CLASSIFICATION
Scituate Reservoir and all tributaries thereto and North Branch Pawtuxet River and Scituate Reservoir to 1/2 mile downstream from dam	A	A
North Branch Pawtuxet River from 1/2 mile downstream of Scituate Reservoir Dam to Fiskeville Dam	B	B
North Branch Pawtuxet River from Fiskeville Dam to the confluence of North and South Branches of the Pawtuxet River at River Point	C	C
Pawtuxet River from confluence of North and South Branches of the Pawtuxet River at River Point to the Pawtuxet Cove Dam at Pawtuxet	C/D	C
Meshanticut Brook to its confluence with Pawtuxet River	B	B
Three Ponds Brook to its confluence with Pawtuxet River	B	B
Pocasset River and its tributaries to Print Works Pond discharge	B	B
Pocasset River from discharge of Print Works Pond to its confluence with Pawtuxet River	C	C

RIVER SECTION	PRESENT WATER QUALITY CONDITIONS	CLASSIFICATION
Spectacle Pond	C	B
Mashapaug Brook from Spectacle Pond including Mashapaug Pond and all ponds in Roger Williams Park to its confluence with Pawtuxet River	C	C
Aldrich Brook to it confluence with Pawtuxet River	B	B
Big River and all its tributaries to its entrance into Flat River Reservoir at Harkney Hill Road Highway Bridge	A	A
Flat River Reservoir from Harkney Hill Road to South Main Street Highway Bridge, Washington on the South Branch of Pawtuxet River including all tributaries thereto	B	B
South Branch Pawtuxet River from South Main Street Highway Bridge, Washington to its confluence with Pawtuxet River	C	C
Tiogue Lake	B	B

MAIN STEM PAWTUXET RIVER
(0006017)

This river segment extends from the confluence of the North and South Branches of the Pawtuxet River in the Town of West Warwick to its entry into Narragansett Bay at the Cranston Warwick boundary. Included in this waterbody unit are Meshanticut Brook and its tributaries and Spectacle and Fenner Ponds located largely in Cranston; Mashapaug and the Roger Williams Park System Ponds located in Providence; and finally, Three Ponds Brook located in Warwick. Despite their urban setting and the typical adverse water quality impacts associated with this land use, many of the waters are considered valuable recreational resources. Fish are stocked in Meshanticut Brook and the state operates a park at Meshanticut Pond. Another public access is located at Mashapaug Pond where the state maintains a boat launching ramp. The shoreline of ponds located within Roger Williams Park are easily accessible to the public; paddle boats are used on one of the ponds.

A detailed assessment of this waterbody unit has been prepared using both "evaluated" and "monitored" information to describe conditions in the various lakes, ponds and river reaches within this waterbody unit.

The intensive water quality monitoring performed by Quinn et al (1985) on the main stem indicate exceedances in chronic criteria for lead, silver, fluoranthene, butyl benzyl phthalate, and napthalene; and acute criteria for cadmium and copper. The discharge from three sewage treatment plants, urban stormwater runoff and in-stream sediments contribute to the impairment of the segment's designated use; 11.7 miles are affected by nutrients, heavy metals, low dissolved oxygen, and heavy BOD/COD loads. Monitoring of the stormwater discharges from Interstate-95, and two major commercial malls in Warwick indicate these sources contribute significant loads of petroleum hydrocarbons and heavy metals (Hoffman et al, 1982, 1985). It is reasonable to expect that other discharges of stormwater runoff from urban areas such as the one at the Three Ponds Brook area also contribute toxic pollutants.

An Agriculture Nonpoint Assessment for Providence County was completed by the Soil Conservation Service with support of the Northern Rhode Island Conservation District in March 1988. The inventory identified two fields or approximately 68 acres planted in sweet corn and other vegetables located within the Main Stem's watershed. The estimated cumulative annual soil loss from these fields is 12 tons/acre. Cover crops are planted on the fields and additional measures are recommended. These fields may contribute sediments to the Main Stem.

A preliminary report of a water quality study performed for DEM on Meshanticut Pond indicates elevated concentrations of nutrients and depressed dissolved oxygen conditions in the benthic waters. The pond has a relatively high pH value, 8.0-9.0 and can be classified as eutrophic. Typical of

eutrophied waters, heavy aquatic plant growth and algae blooms have been noted. The RI Division of Fish and Wildlife has collected samples from Meshanticut Brook for pH and alkalinity analyses; no other known recent monitoring data are available on this river. The agriculture nonpoint assessment identified 58 acres of annually tilled cropland within the watershed of Meshanticut Brook. The estimated cumulative annual soil loss from these seven fields is 51 tons/acre. Resource management measures are practiced on few of the fields and it is likely that they contribute some sediments to the brook. The conversion of agricultural fields to urban uses in this watershed suggests that nonpoint source contributions from ISDS, runoff, and erosion and sedimentation will have increasing significance over time and represent a potential threat to existing water quality conditions and fisheries habitat of this 11.7 mile river system. Currently, it is assessed as being in full support.

No recent water quality monitoring data are available on Spectacle Pond. Evaluated data indicate dense algae blooms are common. Contributions from dense urban development likely contribute nutrients and heavy metals. This 31 acre pond is not supporting designated uses due to nonpoint sources.

Similar to Spectacle Pond, Mashapaug Pond is located in a heavily urbanized watershed and receives stormwater runoff discharges. A study by Quinn et al (1986) found elevated concentrations of heavy metals, petroleum hydrocarbons, PAHs, pthalates and coprostanol in the sediments. All constituents are thought to originate from stormwater runoff draining urbanized areas. A screening of the water column for these pollutants did not find any extreme concentrations. Bacteriological data suggest the water easily meets its Class C criteria and in dry weather, the water quality even meets Class B criteria. This 69 acre pond is in full support of its designated uses; nonpoint sources have contributed to it not attaining fishable/swimmable conditions.

There are no recent water quality data available for the Roger Williams Park Ponds. The designated use class is C. The ponds are assumed to be fully supporting Class C designated uses, as such fishable/swimmable conditions are non-attainable.

No monitoring data are available on Three Ponds Brook. Evaluated information notes that the brook receives stormwater runoff from the surrounding urbanized drainage area, therefore contributions of nutrients and toxics may be expected. Without specific monitoring data, this 2.1 mile segment is assumed to be in support of Class B designated uses, however is threatened by nonpoint source pollutants.

In summary, 13.8 miles and 191 acres are found to be in full support; of these waters, 13.8 miles and 122 acres are threatened by nonpoint sources of pollution. Thirty-one acres

and 11.7 miles are found to not support designated uses. In terms of fishable/swimmable conditions, 13.8 miles are supported for both uses. 31 acres are not fishable/swimmable, but are attainable. 191 acres are not attainable for fishing/swimming.

DATA: Monitored

SOURCES:

R. Wright and B. McCarthy. 1985. Computer Modeling of the Pawtuxet River, Volume II.

Rhode Island Department of Environmental Management. 1987. Pawtuxet River Basin Nonpoint Source Water Quality Standards Review and Management Plan.

James G. Quinn, et al. 1986. A Report on the Distribution of Organic Components and Trace Metals in Mashapaug Pond Sediments.

Lee Pare and Associates. 1980. Improvement of Water Quality in Roger Williams Park. Prepared for the City of Providence, Department of Public Works.

James G. Quinn, et al. 1985. A Study of the Water Quality of the Pawtuxet River, Chemical Monitoring, Volume I.

Rhode Island Department of Environmental Management. 1988. Report on Meshanticut Lake Diagnostic Study. Prepared by Tutela Engineering Associates, Inc.

Department of Health. 1983. Laboratory Report.

Rhode Island Department of Environmental Management. 1986. The State of the State's Waters-Rhode Island, A Report to Congress (PL 92-500, 305(b)).

Eva J. Hoffman, et al. 1982. Petroleum Hydrocarbons in Urban Runoff from a Commercial Land Use Area. Journal of Water Pollution Control Federation 54:1517-1525.

Eva J. Hoffman, et al. 1985. Stormwater Runoff from Highways. Water, Air and Soil Pollution 25:349-364.

"Waters of the State" or "water" means all surface water and groundwater of the State of Rhode Island, including all tidewaters, territorial seas, wetlands, land masses partially or wholly submerged in water, and both inter- and intrastate bodies of water which are, have been or will be used in commerce, by industry, for the harvesting of fish and shellfish or for recreational purposes.

"Wetlands" means those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

Section 6 - Water Quality Standards

6.1 Purpose. A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. Water quality standards are intended to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (the Act) and Chapter 46-12 of the General Laws of Rhode Island. "Serve the purposes of the Act" (as defined in Section 101(a)(2) and 303(c) of the Clean Water) means that water quality standards should, whenever attainable, provide water quality for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water and take into consideration their use and value of public water supplies, propagation of fish, shellfish, and wildlife, recreation in and on the water and agricultural, industrial, and other purposes including navigation.

Such standards serve the dual purposes of establishing the water quality goals for a specific water body and serve as the regulatory basis for the establishment of water-quality-based-treatment controls and strategies beyond the technology-based levels of treatment required by Sections 301(b) and 306 of the Clean Water Act.

6.2 Water Use Classification - The waters of the state shall be assigned to one of the classes listed below. Each class is defined by the most sensitive, and therefore governing, uses which it is intended to protect:

6.21 Freshwater -

Class A - (drinking) water supply

Class B - public water supply with appropriate treatment

- agricultural uses

- bathing, other primary contact recreational activities

- fish and wildlife habitat

Class C - boating, other secondary contact recreational activities

- fish and wildlife habitat

- industrial processes and cooling

*Class D - migration of fish

- good aesthetic value

*Class E - Nuisance conditions; uses limited to:

- certain industrial processes and cooling

- power

- navigation

*Classes D and E shall be used to describe an existing condition only, and shall not be considered an acceptable goal for classification of any water.

6.22 Sea Water -

Class SA - bathing and contact recreation

- shellfish harvesting for direct human consumption

- fish and wildlife habitat

Class SB - shellfish harvesting for human consumption after depuration

- bathing, other primary contact recreational activities

- fish and wildlife habitat

Class SC - boating, other secondary contact recreational activities

- fish and wildlife habitat

- industrial cooling

- good aesthetic value

6.3 Water Quality Criteria - The following physical, chemical and biological criteria are parameters of minimum water quality necessary to support the water use classifications of subsection 6.2 and shall be applicable to all waters of the State.

6.31 General Criteria - The following minimum criteria are applicable to all waters of the State, unless criteria specified for individual classes are more stringent:

1. At a minimum, all waters shall be free of pollutants in concentrations or combinations that will:

   (a) Adversely affect the composition of bottom aquatic life;

   (b) Adversely affect the physical or chemical nature of the bottom;

   (c) Interfere with the propagation of fish and shellfish; or,

   (d) Undesirably alter the qualitative and quantitative character of the biota.

2. Aesthetics - all waters shall be free from pollutants in concentrations or combinations that:

   (a) Settle to form objectionable deposits;

   (b) Float as debris, scum or other matter to form nuisances;

   (c) Produce objectionable odor, color, taste or turbidity; or,

   (d) Result in the dominance of nuisance species.

3. Radioactive substances - The level of radioactive materials in all waters shall not be in concentrations or combinations which would be harmful to human, animal or aquatic life, or result in concentrations in organisms producing undesirable conditions.

4. Nutrients - Nutrients shall not exceed the site-specific limits necessary to control accelerated or cultural eutrophication, and Best Management Practices shall be used to control sedimentation and erosion.

5. Thermal Mixing Zones - In the case of thermal discharges into tidal rivers or estuaries, or fresh water streams or estuaries, where thermal mixing zones are allowed by the Director, the mixing zone will be limited to no more than 1/4 of the cross sectional area and/or volume of river flow, stream or estuary, leaving at least 3/4 free as a zone of passage. In wide estuaries and oceans, the limits of mixing zones will be established by the Director.

6. Non-thermal Mixing Zones - In applying these standards the Director may recognize, where appropriate, a limited mixing zone or zone of initial dilution on a case-by-case basis. The locations, size and shape of these zones shall provide for the maximum protection of aquatic resources. At a minimum, mixing zones must:

   (a) Meet the criteria for aesthetics;

   (b) Be limited to an area or volume that will minimize interference with the designated uses in the segment;

   (c) Allow an appropriate zone of passage for migrating fish and other organisms; and

   (d) Not result in substances accumulating in sediments, aquatic life or food chains to exceed known or predicted safe exposure levels for the health of humans or aquatic life.

6.32 Class-Specific Criteria - Fresh Waters

Criterion	Class A*	Class B	Class C	Class D
. Dissolved oxygen	75% saturation, 16 hours/day, but not less than 5 mg/l at any place or time except as naturally occurs.	75% saturation, 16 hours/day, but not less than 5 mg/l at any place or time except as naturally occurs.	Minimum 5 mg/l any place or time,except as naturally occurs. Normal seasonal and diurnal variations above 5 mg/l will be maintained.	A minimum of 2 mg/l at any place or time, except as naturally occurs.
. Sludge deposits-solid refuse-floating solids-oils-grease-scum	None Allowable.	None Allowable.	Sludge deposits, floating solids oils, grease and scum shall not be allowed except for such small amounts that may result from the discharge of appropriately treated sewage or industrial waste effluents.	
. Color and turbidity	None other than of natural origin. Not to exceed 5NTU over background when the background is 50 NTU or less or have more than a 10% increase in turbidity when the background is more than 50 NTU.	None in such concentrations that would impair any usages specifically assigned to this Class. Not to exceed 10 NTU over background when the background is 50 NTU or less, or have more than a 20% increase in turbidty when the background is more than 50 NTU.	None in such concentrations that would impair any usages specifically assigned to this Class. Not to exceed 10 NTU over background when the background is 50 NTU or less, or have more than a 20% increase in turbidty when the background is more than 50 NTU.	None in such concentrations that would impair any usages specifically assigned to this Class.
. Total Coliform bacteria/100 ml	Not to exceed a median value of 100 and not more than 10% of the samples shall exceed a value of 500.	Not to exceed a median value of 1,000 and not more than 20% of the samples shall exceed a value of 2,400.	None in such concentrations that would impair any usages specifically assigned to this Class.	None in such concentrations that would impair any usages specifically assigned to this this Class.
. Fecal coliform bacteria/100 ml	Not to exceed a median value of 20 and not more than 10% of the samples shall exceed a value of 200.	Not to exceed a median value of 200, and not more than 20% of the samples shall exceed a value of 500.	Not applicable.	Not applicable.
. Taste and odor	None other than of natural origin.	None in such concentrations that would impair any usages specifically assigned to this Class nor cause taste and odor in edible portions of fish.	None in such concentrations that would impair any usages specifically assigned to this Class nor cause taste and odor in edible portions of fish.	None in such conentrations that would impair any usages specifically assigned to this Class.

Criterion	Class A*	Class B	Class C	Class D
pH	As naturally occurs.	6.5 - 8.0 or as naturally occurs.	6.0 - 8.5***	6.0 - 9.0
Allowable temperature increase	None other than of natural origin.	Only such increases that will not impair any usages specifically assigned to this Class.**	Only such increases that will not impair any usages specifically assigned to this Class or cause the growth of unfavorable species of biota.	None except where the the increase will not exceed the recommended limits on the most sensitive water use and in no case exceed 90°F.
Chemical	a. Waters shall be free from chemical constituents in concentrations or combinations which could be harmful to human, animal, or aquatic life for the appropriate most sensitive and governing water class use or unfavorably alter the biota. b. If an aquatic toxicity value has not been established in the R.I. DEM Ambient Water quality Guidelines (see Appendix B), then the level of any "priority pollutant" (see Appendix B) shall not exceed the "detection limits" in the ambient water unless the discharger demonstrates to the satisfaction of the Director that a higher concentration will not adversely effect the most sensitive use of the water body. c. The ambient concentration of a pollutant in a water body designated as suitable for fish and/or wildlife habitat shall not exceed the Ambient Water Quality Guidelines, (see Appendix B) for the protection of aquatic organisms from chronic effects, unless the chronic guidelines is modified by the Director based on results of bioassay tests conducted in accordance with the terms and conditions provided in Appendix C. d. The limits prescribed by the United States Environmental Protection Agency will be used where not superseded by more stringent State requirements.			The ambient concentration of a pollutant in a water body designated as suitable for fish mitigation shall not exceed the R.I. DEM Ambient Water Quality Guidelines (see Appendix B) for the protection of aquatic organisms from acute effects, unless the the acute guideline is modified by the Director based on results of bioassay tests conducted in in accordance with the terms and conditions provided in Appendix C.
Phosphorus	None in such concentration that would impair any usages specifically assigned to said Class. New discharges of wastes containing phosphates will not be permitted into or immediately upstream of lakes or ponds. Phosphates shall be removed from existing discharges to the extent that such removal is or may become technically and reasonably feasible.			

* Class A waters used for drinking water supply may be subject to restricted use by State and local authorities.

** The temperature increase shall not raise the temperature of the receiving waters above the recommended limit on the most sensitive receiving water use and in no cases exceed 83 degrees F. In no case shall the temperature of the receiving water be raised more than 4 degrees F. Heated discharges into designated coldwater habitats shall not raise the temperature above 68 degrees F outside an established thermal mixing zone.

*** In accordance with 40 CFR, Part 133.102 (c), those facilities achieving the level of effluent quality attainable through the application of secondary or equivalent treatment may discharge an effluent pH of 6.0 to 9.0 (S.U.) standard units.